

Ouray National Wildlife Refuge Vegetation Mapping Project

V.A.5.N.d.19. *ACHNATHERUM HYMENOIDES HERBACEOUS ALLIANCE*

Indian Ricegrass Herbaceous Alliance

ALLIANCE CONCEPT

Summary: Stands of this alliance occur in two distinctively different habitats (sandy areas and shale barrens) in different geographic areas. Sandy areas include 'blowouts' in the Great Plains, and in arid and semi-arid dune systems in the Chihuahuan Desert, San Luis Valley, Colorado Plateau and Great Basin. The shale barrens sites have been described from a high-elevation mountain in north-central Colorado and a lower elevation site (1415 m) ridgetop in western Colorado. Substrates are sand or shale. This alliance is characterized by a sparse to moderately dense herbaceous layer that is dominated by *Achnatherum hymenoides*. Many species are associated with this grassland depending on habitat and geography. Sandy habitats may include the graminoids *Redfieldia flexuosa*, *Muhlenbergia pungens*, *Hesperostipa comata*, *Schizachyrium scoparium*, *Calamovilfa gigantea*, and forbs *Heliotropium convolvulaceum*, *Polanisia dodecandra* ssp. *trachysperma*, *Polanisia jamesii*, *Psoralidium lanceolatum*, *Reverchonia arenaria*, *Sophora stenophylla*, *Wyethia scabra*, *Abronia angustifolia*, *Senecio flaccidus* var. *flaccidus*. In shaley sites, *Pleuraphis jamesii*, *Hesperostipa comata*, *Pascopyrum smithii*, and *Eriogonum brevicaulis* are common. Scattered shrubs or dwarf-shrubs, such as *Ericameria nauseosa*, *Sarcobatus vermiculatus* or *Krascheninnikovia lanata*, may be present on some stands. Diagnostic of this grassland alliance is the dominance of *Achnatherum hymenoides* in the herbaceous layer and that cover of *Ephedra viridis* will not be significant.

ENVIRONMENTAL DESCRIPTION

USFWS WETLAND SYSTEM: TERRESTRIAL

Ouray National Wildlife Refuge Environment: The *Achnatherum hymenoides* Herbaceous Vegetation type occupies a ridge of sandy soil that is susceptible to wind erosion. This site has probably burned historically, eliminating some of the dwarf shrub foliar cover. Also, some grazing has occurred here, as horse and elk manure was present; the stand also has numerous small mammal burrows. *Agropyron cristatum* occurred as a co-dominant on an approximately 10 m wide corridor, disturbed for pipeline introduction, then reclaimed using both native and non-native grass species. The soils in this area are sand with a few cobbles present on the surface. Small mammal burrows, trails, and scat are common within the corridor.

Global Environment (Alliance): Stands of this alliance occur in two distinctively different habitats and in different geographic areas. All sites have arid or semi-arid climates. Elevations range from 900-2400 m. Substrates are sand or shale.

In sandy areas in the Great Plains it occurs on 'blowout' sites where sandy plains or stabilized dunes have been disturbed (Ramaley 1939). This pioneer community will eventually succeed to a *Artemisia filifolia*- or *Andropogon hallii*-dominated community depending on the amount of precipitation at the site. Elevations are typically below 1500 m. Climate is semi-arid with most of the highly variable precipitation occurring during the growing season. Mean annual precipitation ranges from 30-60 cm. Drought is not uncommon and contributes to the formation of blowouts. Soils are generally deep sands typically with 90% or more bare ground. These areas are usually relatively small, surrounded by finer-textured substrates that support short grasses and other mid grasses.

In the San Luis Valley in Colorado, approximately 2400 m elevation, stands occur on a sand sheet on the windward side of dunes (Renee Rondeau, CONHP, pers. comm.). In arid and semi-arid dune systems in the Chihuahuan Desert, Colorado Plateau and Great Basin stands of this alliance occur in active dunes (Bowers 1982, Burgess and Northington 1977, Castle 1954, Reid 1980, Van Pelt 1978). They are early seral communities that colonize bare sand in interdune valleys. The plants adapt to sand deposition by stem elongation, but eventually will be buried or dug up as the dunes move. On dune margins, stabilization may occur as other sand adapted species colonize, eventually succeeding into the adjacent desertscrub community.

Another association in this alliance occurs on shale barrens in a high-elevation mountain basin between 2200 and 2300 m elevation in north-central Colorado (Francis 1983, Tiedemann et al. 1983). The basin is surrounded by mountain ranges of the southern Rockies. Additionally, another shale site has been found on a gently sloping (<10%) ridgetop at lower elevations (1415 m) in western Colorado where it was described as a large island surrounded by agricultural fields (Peggy Lyons, CONHP, pers. comm.). Climate is semi-arid. Mean annual precipitation is approximately 35 cm. This association is described as a topo-edaphic climax, occurring on soils derived from shales or mudstones. It occupies stabilized badlands with rolling topography, commonly on ridgetops exposed to wind, desiccation and sheet erosion. Soils derived from shale and mudstone are typically shallow, calcareous, alkaline and clayey, often capped by

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a thin gravel layer. Total vegetative cover is relatively sparse and bare soil ranges from 75% to near 100%.

Communities adjacent to the shale site were dominated by *Pleuraphis jamesii* on lower slopes, *Sarcobatus vermiculatus* on bottomlands, and *Atriplex confertifolia* / *Leymus salinus* on north-facing hillsides.

VEGETATION DESCRIPTION

Ouray National Wildlife Refuge Vegetation: *Achnatherum hymenoides* Herbaceous Vegetation has become established along a ridge of sandy soil near the western Refuge boundary. The slope is gradual, approximately 2%, and the stand is oriented to the northwest. Since surrounding areas support dwarf shrublands, this grassland association probably exists because of a past fire diminishing the shrub cover. The *Achnatherum hymenoides* Herbaceous Vegetation stand is less than 0.5 m tall, and has a foliar cover of approximately 45%. *Achnatherum hymenoides* provides approximately 40% foliar cover, with *Hesperostipa comata*, *Opuntia polyacantha* and *Chrysothamnus viscidiflorus* providing the remaining foliar cover. Some exotic plant species are present, including *Bromus tectorum*, *Salsola kali*, and *Sisymbrium altissimum*. The reclaimed pipeline corridor supported foliar cover of approximately 30%, and about 20% of that cover is provided by *Achnatherum hymenoides*. Non-native species introduced to the site, including *Agropyron cristatum*, *Elymus* sp., *Bromus tectorum*, *Salsola kali*, and *Sisymbrium altissimum*, contribute from 5-10% foliar cover in the corridor. Other species present include *Ericameria nauseosa*, *Ambrosia acanthicarpa*, *Helianthus annuus*, and *Sphaeralcea coccinea*.

Global Vegetation (Alliance): Stands in this widespread alliance are found growing in two different habitats, sandy and shaley sites. Both habitats have a sparse to moderately dense graminoid layer dominated by the perennial bunchgrass *Achnatherum hymenoides*. A sparse forb layer may also be present. Codominants will vary by habitat and geography. Other characteristic species of the sandy plains blowout sites or sandsheets are *Heliotropium convolvulaceum*, *Muhlenbergia pungens*, *Hesperostipa comata*, *Polanisia dodecandra* ssp. *trachysperma*, *Polanisia jamesii*, *Psoralidium lanceolatum* (Ramaley 1939). In the San Luis Valley, *Ericameria nauseosa* may codominate where fires are suppressed, *Redfieldia flexuosa* in loose sands, and *Psoralidium lanceolatum* where more stabilized (Renee Rondeau, CONHP, pers. comm.).

On the Colorado Plateau, active dune sites have codominants such as *Calamovilfa gigantea*, *Psoralidium lanceolatum*, *Reverchonia arenaria*, *Sophora stenophylla*, and *Wyethia scabra* (Bowers 1982, Castle 1954). Reid (1980 as reported by Bowers 1982) described Chihuahuan Desert dune flats vegetation in this alliance that included codominants such as *Abronia angustifolia*, *Senecio flaccidus* var. *flaccidus*, and *Schizachyrium scoparium*.

Van Pelt (1978) described a sandy loam woodland park on the Colorado Plateau with canopy cover of 16% *Achnatherum hymenoides*, 1% *Hesperostipa comata*, and a trace of *Elymus elymoides*. The high elevation shaley hills sites in Colorado are codominated by the low, mat-forming, suffrutescent perennial forb *Eriogonum brevicaulis*. Other associated species may include the dwarf-shrub *Krascheninnikovia lanata*, and the forb *Stenotus armerioides*, and the grass *Pascopyrum smithii*. As many as 40 species may occur in this association, but no species list is available. The lower elevation, shaley ridge site in western Colorado had cover of 5-25% *Achnatherum hymenoides*, 5-25% *Gutierrezia sarothrae*, 10% *Pleuraphis jamesii*, 5% *Krascheninnikovia lanata*, and 1% each for *Sarcobatus vermiculatus*, *Ericameria nauseosa*, and *Tetradymia spinosa*. Other associated species were *Eriogonum contortum* and the exotic annual grass *Bromus tectorum* (Peggy Lyons, CONHP, pers. comm.). Cover data were not available for the other sites, but cover is expected to be more sparse.

Dynamics (Alliance): *Achnatherum hymenoides* is one of the most drought-tolerant grasses in the western U.S. and occurs on a variety of xeric sites (USFS 1937). It is also a valuable forage grass in arid and semi-arid regions. Improperly managed livestock grazing could increase soil erosion, decrease cover of this palatable plant species and increase weedy species (USFS 1937).

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MOST ABUNDANT SPECIES

Ouray National Wildlife Refuge

Stratum	Species
DWARF SHRUB	<i>Chrysothamnus viscidiflorus</i> , <i>Opuntia polyacantha</i> , <i>Atriplex canescens</i>
GRAMINOID	<i>Achnatherum hymenoides</i> , <i>Hesperostipa comata</i> , <i>Pleuraphis jamesii</i> , <i>Bromus tectorum</i> , <i>Agropyron cristatum</i>

Global

Stratum	Species
GRAMINOID	<i>Achnatherum hymenoides</i>

CHARACTERISTIC SPECIES

Ouray National Wildlife Refuge

Species
Achnatherum hymenoides, *Hesperostipa comata*, *Chrysothamnus viscidiflorus*, *Opuntia polyacantha*

Global

Species
Achnatherum hymenoides

OTHER NOTEWORTHY SPECIES

Ouray National Wildlife Refuge

Stratum **Species**
N/A

Global

Stratum **Species**
N/A

GLOBAL SIMILAR ASSOCIATIONS: N/A

SYNONYMY: N/A

CLASSIFICATION COMMENTS

Ouray National Wildlife Refuge: N/A

Global Comments (Alliance): Vegetation in this alliance may be too sparse in sandy sites to be classified as grassland. Stands occur in two very different habitats, sandy plains and shale barrens, which may justify splitting the alliance. Renee Rondeau (CONHP pers. comm.) reported that *Ericameria nauseosa* is codominant in fire-suppressed stands in the San Luis Valley in Colorado. These stands may be better classified in the *Achnatherum hymenoides* Shrub Herbaceous Alliance (A.1543). More investigation is needed.

ELEMENT DISTRIBUTION

Ouray National Wildlife Refuge Range: *Achnatherum hymenoides* Herbaceous Vegetation occurs as one large stand on the western edge of the Refuge, and as smaller patches nearer the badlands bluff formations. The *Achnatherum hymenoides* – *Agropyron cristatum* variation was only observed in a pipeline corridor, northwest of Headquarters, where a reclamation seed mix had been introduced to provide soil erosion control.

Global Range (Alliance): Stands of this grassland alliance occur on sandy sites in the Great Plains, Chihuahuan Desert, Colorado Plateau and Great Basin, and on shaley sites in central Colorado and on the Colorado Plateau.

Nations: CA US

States/Provinces: CO ID SK? UT WY

TNC Ecoregions: 10:C, 11:C, 19:C, 20:C, 6:C

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USFS Ecoregions: 313:C, 341:C, 342D:CC, 342G:C?, M331I:CC

Federal Lands: USFWS (Ouray)

ALLIANCE SOURCES

Identifier: A.1262 **Confidence:** N/A **Conservation Rank:** N/A

REFERENCES: Bowers 1982, Bowers 1984, Burgess and Northington 1977, Castle 1954, Francis 1983, Hickman 1993, Marr et al. 1980, Martin et al. 1981, Neher and Bailey 1976, Pammel 1924, Ramaley 1937, Ramaley 1939b, Ramaley 1942, Reid 1980, Reid et al. 1994, Strong 1980, Terwilliger and Tiedemann 1978, Tiedemann et al. 1987, U.S. Forest Service (USFS) 1937, Von Loh 2000, Van Pelt 1978.